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The effect of olive oil on prevention of striae gravidarum: A randomized controlled clinical trial

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KEYWORDS
Striae gravidarum;
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Summary
Objectives: Striae gravidarum (SG) is one of the cutaneous physiological changes during pregnancy with a high prevalence. This study aimed to evaluate the effect of olive oil in prevention of SG.
Design: Randomized controlled clinical trial.
Setting: Health care centers and three Hospitals affiliated to Tehran University of Medical Sciences.
Participants: 100 nulliparous pregnant women.
Interventions: Fifty women were randomly allocated to each study group. The treatment group received 1 cc topical olive oil twice a day to apply on the abdominal skin in a gentle manner without massaging it until the delivery. Control group did not receive any cream or oil during the study.
Main outcome measures: Development of SG and its severity was recorded at the end of the study.
Results: Although the frequency of severe SG was lower in the users of olive oil compared to the other group, no statistically significant difference was found between the two experimental groups and the control group in the incidence and the severity of SG.
Conclusion: Olive oil reduces the incidence of severe SG and increases the incidence of mild SG, but it does not significantly reduce the incidence and the severity of SG and it could not be recommended for SG prevention.

Introduction

Striae gravidarum (SG) is one of the cutaneous physiological changes during pregnancy that is appeared as red[1] and purple[2] lines on the abdominal skin and sometimes the skin of breast, thighs and axilla.[1] Although the main cause of SG is unknown[1], genetic factors,[2] family history, skin type, skin color, young maternal age, gestational age,

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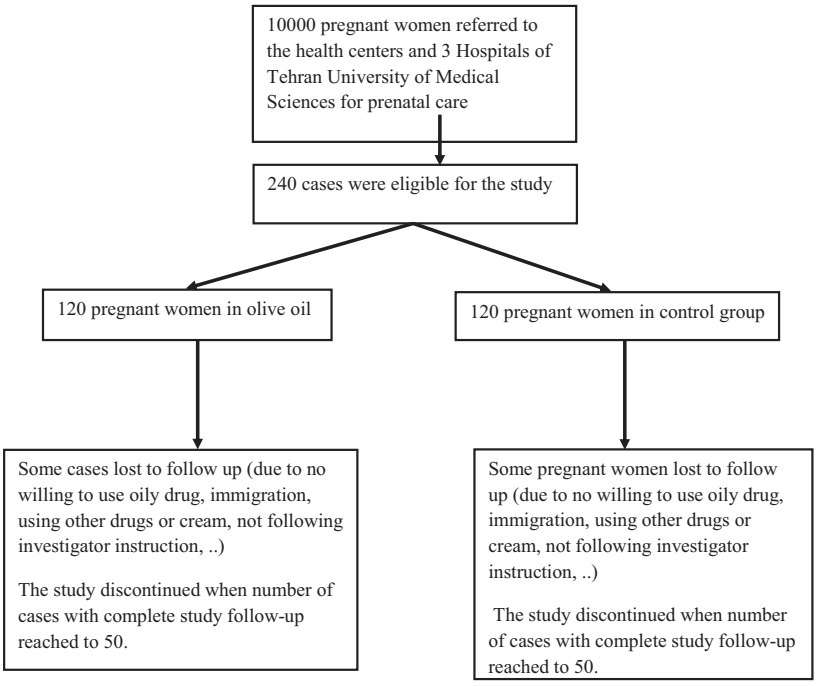

Figure 1 The study flowchart.

birth weight,[1,3,4] malnutrition,[3] gestational diabetes[5] and decreased skin collagen[2] are effective on its incidence.

These cutaneous changes, observed in 90% of pregnancies, can result in cosmetic damages to the mother[6] and sometimes cause emotional problems[7] and lack of self-confidence.[8] In some cases, SG region is injured due to itching.[9] Considering the problems caused by SG, there are always challenges for the prevention and treatment of SG[1]; there are various evidences about the treatment of SG in the past thousands years[5] and many women will to pay exorbitant cost to treat the developed SG.[2]

Since the etiology of SG is unknown, yet no definite specific method has been proposed for its prevention and the treatment. Today, several methods are mentioned to prevent and treat SG including medical methods such as creams, lotions, laser therapy, surgery and herbal therapy.[10] Herbal therapy, one of the methods of complementary and alternative medicine, is preferred because of its fewer complications and less cost compared with the invasive procedures like laser therapy and cosmetic surgery. This method includes vegetable oils, olive oil, almond oil and cocoa butter; however, different studies have shown different healing rate following use of vegetable oils. For example olive oil is rich in vitamin E[3]; Poidevin and Sydney (1956) in a comparative study on 116 women found that cutaneous use of olive oil had no effect on the prevention of the severity of SG.[11] In contrast, in a retrospective study by Davy, in which the questions were asked from 70 women in the postpartum period, olive oil was mentioned as a reducing factor of SG severity.[12] Since the conducted web search revealed no evidences about performing experimental and interventional study to evaluate the effect of olive oil on SG, the present study was designed to evaluate the effect of olive oil on the severity of SG in nulliparous women referring to the health care and treatment centers of Tehran University of Medical Sciences between 2009 and 2010.

Methods

In this randomized controlled clinical trial, all nulliparous women aged between 20 and 30 years with gestational age of 18—20 weeks and a body mass index (BMI) of 18.5—25 who referred to two health care centers and three hospitals of the Tehran University of Medical Sciences for prenatal care were included (see Fig. 1).

Among the referred women 240 were eligible and had inclusion criteria for the study and were selected and included. These participants randomly were assigned to the treatment and control group (120 in each group). Our follow-up duration was from 18—20th gestational week to 38—40th week (delivery time) and during this period, some cases lost to follow-up due to immigration, using other drugs and creams other than ours, premature labor, no willing to use oily drug or not following investigator instruction. These cases were excluded from the study. As the estimated sample size of the study was 50 in each group, we continued the study and followed it until to reach 50 cases in each group that completed the study and after that discontinued the study and did not followed other cases.

Considering the probability of losing some of the participants, 240 individuals were collected in the primary sampling. The women entered into the study in a gestational age of 18—20 weeks and were followed until the time of delivery; therefore, the sampling lasted for about 8 months.

Reasons such as changing the living place, lack of access to the exact address, concern about the side effects and using olive oil combined with other creams resulted in losing some of the cases; ultimately, at the time of delivery, 100 cases were evaluated.

For randomization, the name of each study group (treatment or control) was put in a closed anonymous envelop in a bag and each eligible women herself selected one closed envelope randomly and included in one of the study groups.

Treatment group received 1cc olive oil twice a day for topical use on the abdominal skin in a gentle manner without massaging until the delivery; also it was mentioned that in case of sensitivity to olive oil they should stop treatment. Control group did not use any cream or oil during the study. If the women in the control group wished to use or used any type of cream or oil, they should inform the research team to exclude them from the study. In order to monitor the way of using the drugs, the samples were followed by telephone call once a week during the study and they were informed that if they needed additional calls they could connect with the research team who were ready to answer their questions. Participants with multiple pregnancies, polyhydramnios, developing a cutaneous disease, using corticosteroid drugs, using other creams in the abdominal area, not desiring to continue use of olive oil and using olive oil for less than 3 days a week were excluded from the study.

All of the participants were interviewed and observed by the researcher. A questionnaire including demographic characteristics such as age, educational level, number of pregnancies, number of abortions, gestational age at the time of evaluating the SG, body weight before the intervention, mother's weight after the intervention (in order to evaluate BMI), history of SG in the first-degree relatives, skin type, intervention type and duration of using oil was completed for each participant.

For proving the existence of SG, pictures with a resolution of 10, were taken by Canon[1] camera in the gestational age of 37—40 weeks. In order to blind the study and minimize the biases, it was performed as an intervention using Davy method for scoring SG in the second part of the study. This method is as follows: By passing a vertical and a horizontal line from the umbilicus, the abdomen is divided into 4 imaginary quadrants. Scores 0, 1 and 2 were considered for each of the quadrants, respectively if there was no SG, few lines of SG and numerous lines of SG in each of them. This examination was performed in 37—40 weeks of gestational age by a midwife as the research assistant who was trained how to use the method and was not aware of the previous interventions.

The ethics committee of Tehran University of Medical Sciences approved the study and all of the participants completed the consent form. At the beginning of the study all of the eligible women with inclusion criteria were informed about the objectives of the study and it was mentioned that each of them would randomly enter into one the groups (experimental or control group).

Finally, descriptive statistics including frequency, percent, mean and standard deviation was used for describing the samples. In order to determine the differences in the incidence of SG between experimental and control groups, chi-square test was employed.

Table 1 Demographic characteristics of the individuals in the olive oil user and the control groups.

Group variables	Olive oil group	Control group
Age, mean (SD)	24 (2.8)	24 (2.7)
Education		
Under diploma (*n*, %)	8 (16)	21 (42)
Diploma (*n*, %)	35 (70)	23 (46)
Academic (*n*, %)	7 (14)	6 (12)
Abortion (*n*, %)	4 (8)	2 (4)
History of SG (*n*, %)	36 (72)	30 (60)
Skin color	41 (82)	38 (76)
Dark (*n*, %)	9 (18)	12 (24)

Table 2 The frequency distribution of the SG incidence in the olive oil user and the control groups.

Group	Olive oil user group *n* (%)	Control group *n* (%)	*P* value (95%CI)
SG			
No	32 (64%)	30 (60%)	0.3 (−0.2 to 0.1)
Yes	18 (36%)	20 (40%)	0.3 (−0.2 to 0.1)
Total	50 (100%)	50 (100%)	

Results

The mean age of the olive oil and the control groups was 24 (SD = 2.8) and 24 (SD = 2.7) years, respectively. Most of the individuals (92%) in both groups were experiencing their first pregnancy while 8% had a previous abortion. Diploma was the educational level of the most of the olive oil users and the controls. Also, the majority of the participants in both groups had a light-colored skin and a history of SG on their first-degree relatives (Table 1). There was no significant difference between the groups regarding demographic characteristics (Table 1).

The incidence and severity of SG in the experimental and control groups was not significantly different. Tables 2 and 3 show the incidence and severity of SG. According to the Table 2, SG was developed in 64% of the olive oil group and 60% of the controls.

Table 3 The frequency distribution of the SG severity in the olive oil and the control groups.

SG severity	Olive oil group *n* (%)	Control group *n* (%)	*P* value (95%CI)
No	18 (36%)	20 (40%)	0.3 (−0.2 to 0.1)
Mild	16 (32%)	11 (22%)	0.8 (−0.07 to 0.2)
Moderate	13 (26%)	12 (24%)	0.6 (−0.1 to 0.1)
Severe	3 (6%)	7 (14%)	0.1 (−0.2 to 0.04)
Total	50 (100%)	50 (100%)	

Discussion

This study showed no significant difference in development of SG between treatment and control groups. In a study by Poidevin and Sydney in Adelaide University in Australia, 60% of the olive oil users and 55% of the controls developed SG[11] which was consistent with our study. In contrast, in a study in London by Davy, the incidence of SG was 26% in the olive oil users and 61% in the controls[12]; the difference observed between the results of Davy's and the present study might be due to the type of the studies. Like olive oil, cocoa butter is also a type of vegetable oils. Osman et al. in a study in Beirut indicated that SG was developed in 45% of the cocoa butter users and 48% of the controls.[3] In another study by Bouchanon et al., SG was developed in 44% and 56% of the cocoa butter users and the controls, respectively.[13] The findings of these two studies are consistent with the present study. Table 3 shows that the frequency of mild, moderate and severe SG following use of olive oil was respectively 32%, 26% and 6%. The study by Davy in London demonstrated that the incidence of mild and moderate SG in those using olive oil by massaging was 22% and 2.9%, respectively and no severe SG was observed in that group[12]; the findings of the present study is different from Davy's study which might be due to the type of the studies, the condition of the samples and the way of using the oils.

In the study by Osman et al., the incidence rate of mild, moderate and severe SG was 20.5%, 21.8% and 9%, respectively[3]; however, the incidence of mild SG is different from the present study but the incidence of moderate and severe SG is almost similar.

Since olive oil was used in the present study, it is suggested to design other studies using other vegetable oils such as almond oil, glycerin, cocoa butter and also other available creams especially domestic products in order to achieve the best effect on the prevention of SG and controlling the severity. Considering the safety of the oils and the creams, if further studies find their efficacy in the treatment of SG, pregnant women can use them during their pregnancy.

In conclusion, considering the frequency of mild and severe SG in the olive oil users (32% and 6%, respectively) and in the control group (22% and 14%, respectively), it seems that using olive oil results in a clinically lower incidence of severe SG and a higher incidence of mild SG, but it should be indicated that using topical olive oil with this method and this dosage does not significantly reduce the incidence and severity of SG and it could not be recommended for prevention of SG.

Conflict of interest statement

Authors declare any conflicts of interests.

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